

# Japan Charged-Particle Nuclear Reaction Data Group (JCPRG)

## Nuclear Reaction Data File Steering Committee

Progress Report to the  
IAEA Technical Meeting on the Network of Nuclear Reaction Data Centres  
25-28 September 2006

### **0. General**

Since the last NRDC meeting (October 2005, Vienna), we have carried out the following activities:

1. Data compilation (NRDF and EXFOR)
2. Bibliography compilation (CINDA)
3. Database maintenance and development (NRDF, EXFOR/ENDF and CINDA)
4. Development of digitization system (GSYS)
5. Customer services

### **0.1 Staff**

Our activities have been carried out by 13 group members (6 postdoctoral researchers, 6 graduate students and 1 technical staff). They have been supervised by the NRDF Steering Committee, which consists of 8 senior researchers (7 nuclear physicists and 1 information scientist). All activities have been coordinated by 1 secretary.

### **0.2 Budget**

The regular JCPRG budget ended at March 2001. We have been applying to the Japanese government for a competitive budget for our further activity. This year 4 million JPY is allocated for astrophysical application of nuclear data by the Japan Society for the Promotion of Science (JSPS).

## **1. Data Compilation (NRDF and EXFOR)**

We are continuing data compilation for charged-particle nuclear reaction data obtained with Japanese accelerators.

### **1.1 Scope**

We are scanning 16 journals for Japanese charged-particle nuclear reaction data compilation: PR/C, PRL, NP/A, PL/B, EPJ/A, NST, JP/G, NIM/A, NIM/B, PTP, JPJ, NSE, ARI, RCA, JRN and JNRS. Alerts of new publications from Svetlana Dunaeva (NDS) are always helpful.

### **1.2 NRDF**

From April 2005 to March 2006, CPND in 40 references (631 records, 1.8 MB) have been newly compiled for NRDF. Usually new data are released at the JCPRG web site several months prior to EXFOR.

### **1.3 EXFOR**

Since the 2005 NRDC meeting, we have made 73 new entries and have revised or deleted 41 old entries. These were transmitted as 9 trans files (E034-E038, J004 and R016-R018) to the NDS open area. JCPRG is grateful for valuable comments from Otto Schwerer (NDS) on our transmissions as always. Comments on isotope production data from Sandor Takacs (ATOMKI) are also instructive. Some numerical data were

converted from the McGowan data book to NRDF and EXFOR with help of Victoria McLane (NNDC).

According to the agreement (Conclusion 2004-14) at the 2004 NRDC meeting, the scope of area J is defined as “Charged-particle nuclear data for projectile with non-positive baryon number” (See also Action 2004-24, CP-E/053). Since the last NRDC meeting we moved 4 old entries from area E to area J, but no new entry has been made for area J.

Author proof of EXFOR compilation has been made by researchers from Cyclotron Radioisotope Center (CYRIC) of Tohoku University (Sendai), Institute of Nuclear Research of the Hungarian Academy of Sciences (Debrecen) and Lawrence Berkeley National Laboratory (Berkeley). We appreciate their cooperation.

Compilation of Japanese neutron reaction data is outside our compilation scope in principal. But many corrections were proposed by JCPRG and JAEA, and revised by Stanislav Maev (CJD).

#### **1.4 NRDF/EXFOR editor**

Entries after 2001 have been compiled and revised by our NRDF/EXFOR editor system (HENDEL) including CHEX.

## **2. Bibliography Compilation (CINDA)**

We have been prepared CINDA batches for CPND published in Japan every half year. Each batch covers 6 issues of each of 4 Japanese journals JPJ, PTP, NST and JNRS.

Since 2005 NRDC meeting, one batch (9 new lines and 55 modified lines) has been submitted to NEA-DB (Reader code J). Bibliographies for neutron induced reaction data in JPJ, PTP, NST and reports have been compiled by JAEA Nuclear Data Center (Reader code N) as before.

Some old (before 1944) Japanese neutron records included in the draft of the CINDA master file have been checked and corrected by JCPRG in collaboration with Hans Henriksson (NEA-DB).

## **3. Database Maintenance and Development (NRDF, EXFOR/ENDF and CINDA)**

We are continuing maintenance and development of database for NRDF, EXFOR/ENDF and CINDA.

### **3.1 NRDF**

NRDF is available at <http://www.jcprg.org/nrdf/>. New data, which have been finalized not yet for EXFOR but for NRDF, can be obtained from this site. This retrieval system is written in a Perl script without any database management system. Now we are planning a new search and plot system which is based on Perl and MySQL.

Table: Annual statistics of NRDF search at <http://www.jcprg.org/nrdf/>

	2003	2004	2005	2006 (Estimation)
# of search (Total)	1870	2000	1340	1540
# of search (Hokkaido U. & JAEA)	1090	750	410	430

### **3.2 EXFOR/ENDF**

JCPRG has developed a new search and plot system for EXFOR/ENDF based on Perl and MySQL. This is available at <http://www.jcprg.org/exfor/>. This system covers JENDL-3.2, JENDL-3.3, ENDF/B-VI, JEFF-30, JEFF-31, BROND-2.2, CENDL-2 as well as EXFOR.

Some web-based utilities were also developed. PENDL (<http://www.jcprg.org/endl/>) can output evaluated data libraries in tabulated form at any temperature and accuracy of interpolation. Another system RENORM (<http://jcprg.hucc.hokudai.ac.jp/renorm/>) is a converter from the cross section ratio (e.g. cross section relative to  $^{235}\text{U}(n,f)$  cross section) to the absolute cross section and vice versa using evaluated data libraries as reference cross section sets.

### **3.3 CINDA**

We are developing a new search system of CINDA. This is an extension of EXFOR/ENDF search system mentioned above. A preliminary version of the system is available at <http://www.jcprg.org/cinda/>.

## **4. Development of Digitization System (GSYS)**

A Java-based digitizing system "GSYS" has been improved after the release of the first version and released as GSYS Ver.2 at <http://jcprg.hucc.hokudai.ac.jp/gsys/gsys-e.html>. User interface and design are entirely revised so that the system is more user-friendly. In addition to writing out of data from the system after digitization, the new version can read numerical data sets before digitization. This function is useful when we have a digitized data set made by an old system and want to improve their quality.

## **5. Customer services**

We provide Japanese researchers in the fields of nuclear physics and nuclear engineering with nuclear data as well as nuclear reaction data (NRDF and EXFOR). For more information, we published "Annual Report of Nuclear Reaction Data File Vol.18" in March 2006 (in Japanese with English abstract). We have also issued a list of newly added data into EXFOR every month (<http://jcprg.hucc.hokudai.ac.jp/exfor/recentdata.html>).

We have received many comments on EXFOR compilation from Japanese users (e.g. JENDL evaluators). These comments have been listed to a table (<http://jcprg.hucc.hokudai.ac.jp/exfor/feedbacks.html>), and forwarded to responsible centres.

We have been received requests of laboratory reports (coded in REFERENCE record of EXFOR) from Japanese users. We appreciate Dimitri Rochman (NNDC) and Marina Mikhaylyukova (CJD) for their help to obtain reports issued by institutes in area 1 and 4.

## **ANNEX: Organization and members of JCPRG**

### **NRDF Advisory Committee**

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### **NRDF Steering Committee**

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### **NRDF Annual Report Editorial Committee**

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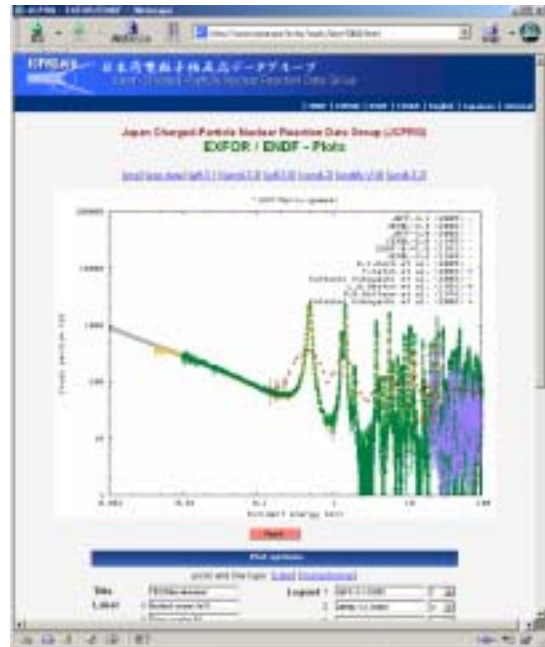
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## Our Products



NRDF search/plot (DARPE)

<http://www.jcprg.org/nrdf/>



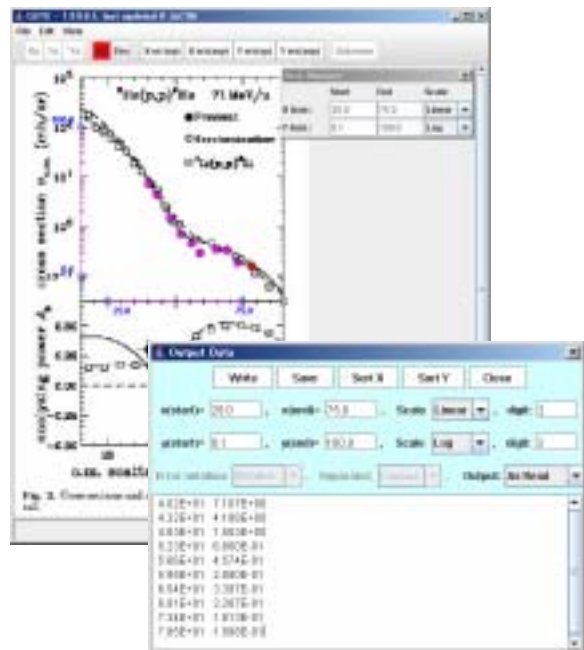
EXFOR/ENDF search/plot

<http://www.jcprg.org/exfor/>



NRDF/EXFOR editor (HENDEL)

<http://jcprg.hucc.hokudai.ac.jp/editor/>



Digitizer (GSYS Ver.2)

<http://jcprg.hucc.hokudai.ac.jp/gsys/gsys-e.html>